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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/619,890	07/15/2003	David M. Forman	BRI/023	7696

7590 03/15/2005

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ART UNIT	PAPER NUMBER
3641	

DATE MAILED: 03/15/2005

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/619,890
Filing Date: July 15, 2003
Appellant(s): FORMAN ET AL.

Thomas J. Brindisi
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 9 February 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

U.S. Patent 6,166,452 to Adams et al.

The Examiner has included the following Non-Patent Literature to further support the examiners position that those in the art are well aware that initiators and detonators are interchangeable, however this evidence was not relied upon in the rejection of claims under appeal.

Definition of "Detonator", 3/4/2001, HYDRO CUT, Terminology and Resource Information, available online @ http://www.hydrocut.com/Terms/D.html and http://web.archive.org/web/20010304121751/http://hydrocut.com/Terms/D.html

Definition of "Initiator", 3/4/2001, HYDRO CUT, Terminology and Resource Information, available online @ http://www.hydrocut.com/Terms/I.html and http://web.archive.org/web/20010304121751/http://hydrocut.com/Terms/I.html

"Miniature Electric Initiator", L3 Communications, KDI Precision Products, Inc. 10 April 2003 available online @ http://www.dtic.mil/ndia/2003fuze/schmidt.pdf

EXPLODING BRIDGEWIRES, Technical Discussion, Exploding Bridgewire (EBW) Detonators, RiSi, copyright © 2000 - www.risi-usa.com, available online @ http://www.risi-usa.com/0products/8td/page03.html and http://web.archive.org/web/20010418201121/http://risi-usa.com/0products/8td/page03.html

CONTINUITY TESTS, 12/10/2000, Integrated Publishing, available online @ http://www.tpub.com/neets/book16/68h.htm and http://web.archive.org/web/20001210064800/http://www.tpub.com/neets/book16/68h.htm

Definition of "data integrity", Microsoft Computer Dictionary Fourth Edition, Microsoft Press, copyright © 1999, Microsoft Corporation

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

The presently appealed rejections are of all pending claims as anticipated under 35 U.S.C. 102(b) by U.S. Patent No. 6,166,452 to Adams et al.

The final office action dated 8/9/2004 contains the following grounds of rejection;

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3-5, 7 and 10-15 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. Patent 6,166,452 to Adams et al., hereafter Adams.

In regards to claim 1, Adams clearly discloses, an electronic detonator having firing-readiness diagnostics, comprising an igniter (10) and electronic circuitry (59) configured and/or programmed to perform one or more firing-readiness diagnostics on the electronic detonator, in figures 2, 3, 5-7, and 10, column 2 lines 59-60, column 3 lines 62-67, column 4 lines 1-12, lines 14-16, lines 55-57, and lines 64-67, column 5 lines 1-6 and lines 24-32.

In regards to claim 3, Adams inherently discloses, wherein the electronic detonator includes an ignition element (55), and the electronic circuitry comprises a continuity check module, in the rejection of corresponding parts of claim 1, above.

In regards to claim 4, Adams clearly discloses, wherein the electronic detonator includes an ASIC that contains the circuitry, in the rejection of corresponding parts of claim 1, above.

In regards to claim 5, Adams clearly discloses, wherein the igniter is hermetically sealed, and the ignition element is a bridgewire, in figures 1-5, column 2 lines 59-60 and lines 66-67, column 3 lines 1-6, lines 11-54, column 4 lines 25-34, column 6 lines 9-33 and lines 40-51.

In regards to claim 7, Adams inherently discloses, wherein the igniter includes a firing capacitor (56), and the electronic circuitry is configured and/or programmed to verify that the firing capacitor has a capacitance above a first value and below a second value, in figure 7, column 4 lines 59-61, and column 5 lines 24-32 and lines 58-65.

In regards to claim 10, Adams inherently discloses, wherein the igniter further includes an ignition element (55), and the electronic circuitry includes a continuity check module, in the rejection of corresponding parts of claim 1, above.

In regards to claim 11, Adams clearly discloses, wherein the igniter is hermetically sealed, and the ignition element is a bridgewire, in figures 1-5, column 2 lines 59-60 and lines 66-67, column 3 lines 1-6, lines 11-54, column 4 lines 25-34, column 6 lines 9-33 and lines 40-51.

In regards to claim 12, Adams clearly discloses, an electronically connected system comprising: a master device (ECU), a bus connected to the master device, and a plurality of electronic detonators connected to the bus, each of the electronic detonators comprising an igniter (10) and electronic circuitry (59) configured and/or programmed to perform one or more electronic detonator firing-readiness diagnostics, in figures 2, 3, 5-7, and 10, column 2 lines 59-60, column 3 lines 62-67, column 4 lines 1-12, lines 14-16, lines 55-57, and lines 64-67, column 5 lines 1-6, lines 13-18, and lines 24-32.

In regards to claim 13, Adams inherently discloses, wherein the igniter includes a firing capacitor (56), and the electronic circuitry is configured and/or programmed to verify that the firing capacitor has a capacitance above a first value and below a second value, in figure 7, column 4 lines 59-61, and column 5 lines 24-32.

In regards to claim 14, Adams inherently discloses, wherein the igniter further includes an ignition element (55), and the electronic circuitry includes a continuity check module, in the rejection of corresponding parts of claim 12, above.

In regards to claim 15, Adams clearly discloses, wherein the igniter is hermetically sealed, and the ignition element is a bridgewire, in figures 1-5, column 2 lines 59-60 and lines 66-67, column 3 lines 1-6, lines 11-54, column 4 lines 25-34, column 6 lines 9-33 and lines 40-51.

(10) Response to Argument

Applicant has divided the argument into four sections, (a) through (d), based on separate claim limitations allegedly not disclosed by Adams. These responses to arguments will also be divided into associated sections for ease of correlation.

(a) **Independent claims 1 and 12 each recite an "electronic detonator" that is "for use in mining or blasting" and has "electronic circuitry configured and/or programmed to perform one or more firing-readiness diagnostics"**

1. In the 2/9/2005 appeal brief, on page 4, first paragraph of section (a), applicant states "prior to the present invention, it is believed that "electronic blasting systems have not employed firing-readiness diagnostics of even critical parts of the electronic detonators such as the firing capacitors and ignition element [and] therefore have not permitted the detection and replacement of any detonators that have faulty firing capacitors or ignition elements prior to firing."" Adams disclosure on column 1, lines 23-26 that "It would also be advantageous to have similar capabilities for selectively igniting various units of reactive materials, such as explosives, in mining or demolition operations." appears to show just what applicant has claimed was not known.

2. With regard to applicants allegation that it is well-known that a ""detonator" detonates and explosive while an igniter for a gas generator is not intended to detonate an explosive..." and "An automotive igniter is thus a significantly

different structure and performs significantly different functions, than a detonator for use in mining and blasting."

a. As previously stated in section (a) 1. above, Adams clearly discloses that it would be advantageous to use his invention in such applications.

b. In response to applicant's argument that Adams, is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, the applicant is concerned with initiating an explosive charge with an electric signal such as the case with Adams. Further, in applicant's declaration filed 3/22/2004, Marshall et al. (US 6,079,332) is classified 102/202.5 - Ammunition and Explosives/Igniting Devices and Systems/Electrical primer or igniter - and Bailey (US 5,988,069) is cross-referenced to the same class. Since Adams and Bailey are both directed to igniters for use in gas generators of vehicle safety systems, this would tend to indicate that the Bailey reference is analogous art and therefore so is the Adams reference. Again, these facts are further supported by Adams disclosure col. 1, lines 23-26, wherein it states, "It would be advantageous to have similar capabilities for selectively igniting various

units of reactive selected variables, such as explosives, in mining or demolition operations",

c. HYDRO CUT, Terminology and Resource Information provides a definition of "Detonator" from 2001, wherein the definition includes "Any device containing any initiating or primary explosive that is used for initiating detonation...The term includes, but is not limited to, electric blasting caps of instantaneous and delay types, blasting caps for use with safety fuses, detonating cord delay connectors..." HYDRO CUT defines "Initiator" as "Small quantity of very sensitive and powerful explosive used to start the detonation of another less sensitive explosive." And "A detonator or detonating cord used to start detonation in an explosive material." (Underlining added) To use the term "detonator" in the definition of the term "Initiator" surely implies that those in the art know the similarities and interrelationships.

d. The "Miniature Electric Initiator" from L3 Communications, KDI Precision Products, Inc. 10 April 2003, further demonstrates that initiators and detonators are at least similar/interchangeable as disclosed on pages 3, 5, 7, and 8 wherein packaged initiators allow simplification of printed wiring boards (page 3), all fire energies are similar to M100 Electric Detonator (page 5), the "detonator" cup is drawn from Stainless Steel (page 7) and "Explosive dispensed into cup and consolidated" (page 8).

e. EXPLODING BRIDGEWIRES, Technical Discussion, Exploding Bridgewire (EBW) Detonators, RiSi, copyright © 2000, further teaches how detonators are similar to initiators starting with the first sentence under the section heading EXPLODING BRIDGEWIRE DETONATOR CONSTRUCTION wherein "The inert components of an exploding bridgewire detonator are similar to any standard low energy electric initiator..." (Underlining added)

The Examiner has set forth several documents as evidence that show it has been well known that detonators and initiators (automotive igniters) share commonalities and interchangeability, including structures and functions.

3. As explained above, Adams is "capable of performing the intended use". The recitation "for use in mining or blasting" was not given patentable weight because the recitation occurred in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951). Further, the limitation "for use in mining or blasting" is essentially a recitation of the intended use and a recitation of the intended use of the claimed invention must result in a structural difference between the claimed

invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). Again, as explained above, Adams is "capable of performing the intended use"

4. In the last sentence of the middle paragraph of page 5 of the 2/9/2005 Appeal Brief, Applicant alleges that the 8/9/2004 Office action "does not address the added limitation "Electronic detonator," or the clear structural and functional differences between a detonator and the igniter disclosed by Adams." Page 4, section 8 of said the 8/9/2004 Office action discloses that Adams is "capable of performing the intended use" (an electronic detonator for use in mining or blasting) and as explained above, the structural and functional similarities between a detonator and igniter have already been addressed.

5. Applicant argues that Adams does not adequately disclose the claimed electronic detonator having firing-readiness diagnostics, because "one of ordinary skill in the art could [not] have combined [Adam's] description...with his own knowledge to make the claimed invention." and further alleges that the quoted passage of Adams is nothing more than a general, tangential and non-

enabling background comment..." Applicant also quotes Adams column 7 lines 2-8 in an attempt to prove his position. Although applicant assumes Adams is primarily directed towards airbag inflators/gas generators, Adams makes it clear in his abstract, as well as column 1 lines 23-26 and column 7 lines 9-18 that his invention is directed towards "an igniter for igniting a reactive material" (first sentence of Abstract), and that "many alternate embodiments and additional embodiments will become apparent to those skilled in the art" (including mining and demolition operations) and that "such alternative embodiments are to be construed as being within the spirit of the present invention even though not explicitly set forth herein," Simply stating that the quoted passage of Adams is nothing more than a general, tangential, non-enabling, wishful background comment does not make it so.

REGARDING APPLICANT'S 29 MAY 2002 DECLARATION FILED 22 APRIL 2004.

6. Applicant argues that incorporating hermetically sealed automotive-style igniters into a detonator was not within the ordinary skill in the art at the time.

a. Said declaration is not related to the instant application or the Adams Patent. The May 29, 2002 declaration under 37 CFR 1 .132 filed 22 April 2004 is insufficient to overcome the rejection of claims 1, 3-5, 7 and 10-15 based upon Adams as set forth above because: it refers only to the system described in the application referenced by the declaration and

not to the individual claims of the instant application. Thus, there is no showing that the objective evidence of nonobviousness is commensurate in scope with the claims. See MPEP § 716.

b. In addition, the L3 communications document clearly shows incorporating hermetically sealed automotive-style igniters into a detonator was within the ordinary skill in the art at the time.

(b) Dependent claims 3-5 also recite that the detonator includes an "ignition element" and a "continuity check module"

The following arguments incorporate by reference, and apply in addition to, the preceding arguments of section (a) regarding independent claims 1 and 12. Applicant alleges that Adams does not specifically disclose a continuity check module and that the examiner has failed to provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art and that it is unclear what Adams means by "integrity data" or what tests may or may not be involved in "comparing...firing loop (heating means activation circuitry) integrity data to predetermined limits.".

1. Applicant states that it is unclear what Adams means by "integrity data," or what tests may or may not be involved in "comparing...firing loop (heating means activation circuitry data to predetermined limits."

a. It is well known that the purpose of diagnostic circuitry is to verify the conditions of the article having diagnostics performed upon it. Diagnostic tests take many forms, determined by (among others) the properties of the item being tested. It stands to reason that diagnostic circuitry constructed and/or programmed to diagnose specific items would be appropriately designed to do so. In this regard, Adams surely teaches that the diagnostic means is diagnosing the integrity all of the critical features of the initiator including the firing loop and heating means activation circuitry which would inherently include the bridgewire because if the bridge wire is not intact and continuous, regardless of the functionality of ANY of the other features, items, circuits, etc. the initiator WILL NOT FIRE.

b. The term "integrity data" as disclosed in Adams lacks specific definition within the disclosure. To this end we must turn to the definitions of each word individually and to both combined. Merriam-Webster's Collegiate Dictionary Tenth Edition defines integrity as "An unimpaired condition, soundness, the quality or state of being complete or undivided, completeness." and data as "factual information (such as measurements or statistics) used as a basis for reasoning, discussion or calculation." This

would tend to lead one to interpret "integrity data" as factual information regarding the unimpaired condition, soundness, quality or state of being complete of the item, article, circuit or whatever the information is being gathered from, or in other words, how well is something doing the job it was designed to do, how close is the current integrity to the predetermined and expected value.

In addition, since the Adams invention is concerned with using microprocessors, multiplexers and analog-to-digital converters, one may also look to the computer art to help. Microsoft Computer Dictionary Fourth Edition does not contain a definition of "integrity data", however it does contain a definition of "data integrity". Data integrity is "The accuracy of data and its conformity to its expected value, especially after being transmitted or processed." This tends to teach that if data integrity is the accuracy of data and is conformity to expected values especially after being...processed, then integrity data would be information or data disclosing the specifics of how accurate and conforming to expected values the data is after processing, i.e. indication of how accurately something is working, conforming to predetermined values, or intact.

Therefore it stands to reason that what Adams means by "integrity data" is information that represents how close to an unimpaired condition the specific article is, which must stem from a measurement of the current condition or value and a comparison of the expected or predetermined

condition or value, which would require a specific type of test for each specific device to be tested, i.e. a continuity check for the bridgewire, resistance checks for resisters, capacitance checks for capacitors (energy storage capacity data), algorithmic checks of microprocessors, etc. etc. etc.

2. Adams discloses that an application specific integrated circuit (ASIC) provides control and diagnostic functions for the igniter (column 4, lines 64-67), the resistor (60) sets up a diagnostic current (column 4, lines 14-15) and that the controller has diagnostic means for comparing igniter controller integrity data, energy storage capacity data, and firing loop (heating means activation circuitry) integrity data to predetermined limits and generating fault warning messages and integrity status messages to the ECU (Electronic Control Unit). The diagnostic means comprises, for example, a multiplexer and an analog-to-digital converter for reading the safety device controller integrity data and for sending controller integrity data to the ECU.

a. Although Adams does not specifically disclose a continuity check module, the fact that Adams does disclose a diagnostic current and a diagnostic means that is comparing integrity data to predetermined limits. Adams must be disclosing a continuity check module incorporated within the diagnostic means, because if current does not go through the bridgewire, then the continuity must be bad and he has not expressly

disclosed other means for diagnosing system components such as the bridgewire.

b. To further support the examiners position, CONTINUITY TESTS, 12/10/2000, Integrated Publishing teaches, "open circuits are those in which the flow of current is interrupted by a broken wire...or any means by which current cannot flow. The test used to detect open circuits (or to see if the circuit is complete or continuous) is continuity testing...Normally continuity tests are performed in circuits where the resistance is very low, such as the resistance of a copper conductor ((i.e. a bridgewire))..."((comment added by examiner)). This teaching further supports the examiners position that it is well known in the art to use current to verify continuity and that Adams may be using the diagnostic current from resistor (60) in order to verify the bridgewire is such.

3. The examiner has shown specifically where within Adams the relevant sections lie in addition to supporting rationale and evidence that those in the art are well versed in the meets and bounds of the term diagnostic and the purpose of diagnostic systems. Further the examiner has shown wherein Adams establishes a diagnostic current, a diagnostic means and motivation for diagnosing all critical articles/items/subsystems within the initiator.

(c) **Dependent claims 7 and 15 also recite that the "electronic circuitry is configured and/or programmed to verify that the firing capacitor has a capacitance above a first value and below a second value"**

The following arguments incorporate by reference, and apply in addition to, the preceding arguments of section (a) above, regarding independent claims 1 and 12.

1. Applicant alleges on the top of page 12 of the 2/9/2005 Appeal Brief, that Adams does not contain an "express disclosure of a capacitance check. It is respectfully submitted that the burden of proving inherent disclosure (see MPEP 2112) by providing "a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent teachings of the has not been met because characteristic necessarily flows from the applied prior art," Levy, 17 USPQ2d at 1464, there is no rationale to support a determination that. a capacitance check necessarily flows from Adams' teachings."

a. Adams clearly discloses in column 5 lines 24-32 and 58-65 that the controller has diagnostic means for comparing energy storage capacity data to predetermined limits and that controlling the activation of the igniter includes storing energy on an energy storage capacitor from a power supply by charging the energy storage capacitor and comparing energy storage capacity data to predetermined limits. Surely a

capacitance check must be performed because the amount of energy a capacitor is capable of storing is directly related to its capacitance.

b. As explained in section (b) 2 above, Adams resistor (60) sets up a diagnostic current with about a 75K ohm resister (with a 1% variation). Adams further discloses the approximate predetermined value of the capacitor in column 4 lines 59-63 as "the exemplary...energy storage device...capacitance value of about 2.2 micro-farads."

c. With the given capacitance value and a diagnosis current, the diagnostic means must be performing a capacitance check as indicated by the phrase "energy storage capacity data" which would have an upper and a lower limit in order to determine its integrity and the minimum and maximum amounts of energy that may be stored.

2. Applicant further argues in the last paragraph of page 12 of the 2/9/2005 Appeal Brief that Adams does not perform the capacitance checks in the same manner as applicant. It should be noted that the method of performing the capacitance check is a method claim and the claims in appeal are apparatus claims and in that regard, none of the appealed claims claim or even mention the manner in which the capacitance check is effected.

(d) Dependent claims 10, 11, 13, and 14 also recite each of the limitations of sections (b) and (c) above

This section is not considered to be an issue because there are no associated arguments. Applicant incorporates all of the preceding sections (a), (b), and (c) by reference, as allegedly all apply to claims 10, 11, 13 and 14, each of which contains all of the relevant limitations discussed in the aforementioned sections, therefore all of the arguments and their associated responses are also incorporated herein by reference as already being addressed in said aforementioned sections.

Once again, the examiner has included several references that further support, characterize and rationalize the definitions and level of knowledge in the art of initiators, detonators and diagnostics.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Daniel Lawson Greene Jr. 5/7/2006

Conferees:

Michael Carone and

Peter Poon

MICHAEL J. CARONE
SUPERVISORY PATENT EXAMINER